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The LCLS-II modular optical delivery system: lessons learned

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The LCLS-II optical delivery system supports multiple interaction points across multiple experiment hutches using only a handful of laser sources. This reduces financial burden and space usage at the cost of increased complexity for the optical laser systems. To ameliorate this complexity, each interaction point is supplied with a Modular Optical Delivery System (MODS) to inject, shape, and compress the beam before it is further conditioned for the experimental use. To meet operational demands, these MODS must be highly configurable, flexible, and robust while supporting 140+ control points in a dense enclosure. With control points spanning piezoelectric motors, optical imaging, digitizers, and more, the EPICS control system framework simplifies driver maintenance and allows growth of community-driven solutions. Each control point is accessible remotely via pyDM GUI which enables the operator to control these various alignment and diagnostic tools. Managing the deployment and operational stability of these modular systems is nontrivial and has presented several challenges in recent runs that inspired significant design changes for the future of the MODS. This talk takes a closer look at these operational challenges and the solutions we've implemented.

Footnotes

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